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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

NGUYEN, JOSEPH H

ART UNIT PAPER NUMBER

2815

DATE MAILED: 08/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/092,231

Applicant(s)

SAKAI, SHIRO

Examiner

Joseph Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5-9.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Marx et al (EP 0779666 A2).

Regarding claim 1, Marx et al discloses on figure 1 a method for manufacturing a gallium nitride compound semiconductor comprising the steps of (a) forming a first gallium nitride compound semiconductor 3 on a substrate 1; (b) forming of a composition material of the first gallium nitride compound semiconductor a discrete area on the first gallium nitride compound semiconductor; and (c) forming a second gallium nitride compound semiconductor 4 on which the composition material is formed; wherein a spatial fluctuation is created in the band gap by variation in the compositional ratio in the second gallium nitride compound semiconductor created by the composition material.

Regarding claim 2, Marx et al discloses on figure 2 the first gallium nitride compound semiconductor 3 and the second gallium nitride compound semiconductor are AlGa<sub>N</sub>; and the composition material is Ga and Al.

Regarding claim 3, Marx et al discloses on figure 1 a method for manufacturing a gallium nitride compound semiconductor comprising the steps of forming a base layer 3

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on a substrate 1, the base layer constructed by forming a discrete layer for varying the diffusion lengths of composition materials of a gallium nitride compound semiconductor; and forming the gallium nitride compound semiconductor on the base layer; wherein a spatial fluctuation is created in the band gap by creating a variation in the compositional ratio in the gallium nitride compound semiconductor by varying the diffusion lengths of the composition materials.

Regarding claims 5-7, Marx et al discloses on figure 1 all steps of the method set forth in the claimed invention.

Regarding claim 8, Marx et al discloses on figure 1 a light emitting element comprising a gallium nitride compound semiconductor, the light emitting element comprising a substrate 1; a first gallium nitride compound semiconductor layer 3 formed on the substrate; a composition material of the first gallium nitride compound semiconductor formed as a discrete area on the first gallium nitride compound semiconductor layer; and a second gallium nitride compound semiconductor layer 4 having a varied compositional ratio and formed on the first gallium nitride compound semiconductor layer onto which the composition material is formed.

Regarding claim 9, Marx et al discloses on figure 1 the first gallium nitride compound semiconductor 3 and the second gallium nitride compound semiconductor 4 are AlGa<sub>N</sub>; and the composition is Ga or Al.

Regarding claim 10, Marx et al discloses on figure 1 a light emitting element comprising a gallium nitride compound semiconductor, the light emitting element comprising a substrate 1; a base layer 3 formed on the substrate and constructed by

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forming a discrete layer for varying the diffusion lengths of the composition materials of the gallium nitride compound semiconductor; and a gallium nitride compound semiconductor layer 4 having a varied compositional ratio an formed on the base layer.

Regarding claims 11-12, Marx discloses on figure 1 all the structures set forth in the claimed invention.

Claims 1-3, 5-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Nagahama et al.

Regarding claims 1-3, 5-7, Nagahama et al discloses on figure 1 all steps of the method set forth in the claimed invention.

Regarding claims 8-13, Nagahama et al discloses on figure 1 all the structures set forth in the claimed invention.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Marx et al or Nagahama as applied to claim 3 above, and further in view of Sakai et al (a new method of reducing dislocation density in GaN layer grown on sapphire substrate by MOVPE).

Regarding claim 4, Marx et al or Nagahama discloses substantially all steps of the method set forth in the claimed invention except the layer for varying the diffusion lengths of the composition materials formed from SiN. However, Sakai et al discloses on figure 3 the layer for varying the diffusion lengths of the composition materials formed from SiN. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Marx et al or Nagahama by having the layer for varying the diffusion lengths of the composition materials formed from SiN for the purpose of reducing dislocation density in a light-emitting element.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Patent 6046464 to Schetzina discloses a semiconductor device.

### ***Conclusion***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Nguyen whose telephone number is (703) 308-1269. The examiner can normally be reached on Monday-Friday, 7:30 am- 4:30 pm

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned is (703) 308-7382 for regular communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JN  
July 31, 2003



EDDIE LEE  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800